

## INFRARED DEVICES

### **Large format, Broadband and Multi-Color GaAs/AlGaAs Quantum Well Infrared Photodetector (QWIP) Focal Plane Arrays**

**Sumith V. Bandara, Sarath D. Gunapala, John K. Liu, Sir B. Rafol, David. Z. Ting and , J. M. Mumolo.**

**Center for Space Microelectronics Technology  
Jet Propulsion Laboratory  
California Institute of Technology  
4800, Oak Grove Drive  
M.S. 302-306  
Pasadena, CA 91109**

#### Abstract

The GaAs/AlGaAs based Quantum Well Infrared Photodetectors (QWIPs) afford greater flexibility than the usual extrinsically doped semiconductor IR detectors because the wavelength of the peak response and cutoff can be continuously tailored over any wavelength between 6-20  $\mu\text{m}$ . The spectral band width of these detectors can be tuned from narrow ( $\Delta\lambda/\lambda \sim 10\%$ ) to wide ( $\Delta\lambda/\lambda \sim 50\%$ ) allowing various applications. Also, QWIP offers multi-color infrared cameras which is capable of simultaneously acquiring images in different infrared bands. Each pixel of such array consists of vertically stacked, independently readable, QWIP detectors sensitive in different narrow ( $\Delta\lambda \sim 1\mu\text{m}$ ) infrared bands. In this presentation, we will discuss the recent results of large format broadband infrared FPA based on a GaAs/AlGaAs materials system and its performance. The array format is 640x512 with pixel pitch is 25 microns and sensitive in 10-16  $\mu\text{m}$  infrared band. The operating temperature of the FPA is 40K, and it was determined by the charge storage capacity and the other features of the particular readout multiplexer used in this demonstration. In addition, we will discuss the developments in multi-color QWIP array and optimization of QWIP for low background applications.

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#### Presenter's Information:

**Sumith V. Bandara,**  
Center for Space Microelectronics Technology  
Jet Propulsion Laboratory  
California Institute of Technology  
4800, Oak Grove Drive  
M.S. 302-306

Pasadena, CA 91109

Phone: 818-354-7377 Fax: 818-393-4540

e-mail: [sumith.v.bandara@jpl.nasa.gov](mailto:sumith.v.bandara@jpl.nasa.gov)